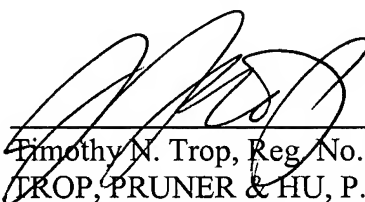## REMARKS

Claim 1 has been amended to include the subject matter of claim 6 that calls for a fuzzy inference system controller. As explained in the material attached from the Internet, a fuzzy inference is the process of formulating the mapping from a given input to an output using fuzzy logic. Fuzzy logic is a mathematical technique for dealing with imprecise data and problems that have many solutions, rather than one. Although it is implemented in digital computers which ultimately make only yes/no decisions, fuzzy logic works with ranges of values solving problems in a way that resembles human logic. See material from the Computer Desktop Encyclopedia attached.

There is nothing that remotely suggests using fuzzy logic in the way claimed in the cited reference. Therefore, reconsideration would be appropriate.

Respectfully submitted,

Date: <u>April 2, 2007</u>

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Fuzzy Logic Toolbox

Fuzzy Inference Systems

- What are Fuzzy Interference Systems?
- Tipping Problem Revisited
- The Fuzzy Inference Diagram
- Customization

What are Fuzzy Interference Systems?

Fuzzy inference is the process of formulating the mapping from a given input to an output using fuzzy logic. The mapping then provides a basis from which decisions can be made, or patterns discerned. The process of fuzzy inference involves all of the pieces that are described in the previous sections: Membership Functions, Logical Operations, and If-Then Rules. There are two types of fuzzy inference systems that can be implemented in Fuzzy Logic Toolbox: Mamdani-type and Sugeno-type. These two types of inference systems vary somewhat in the way outputs are determined. See the Bibliography for references to descriptions of these two types of fuzzy inference systems, [8], [11], [16].

Fuzzy inference systems have been successfully applied in fields such as automatic control, data classification, decision analysis, expert systems, and computer vision. Because of its multidisciplinary nature, fuzzy inference systems are associated with a number of names, such as fuzzy-rule-based systems, fuzzy expert systems, fuzzy modeling, fuzzy associative memory, fuzzy logic controllers, and simply (and ambiguously) fuzzy systems.

Mamdani's fuzzy inference method is the most commonly seen fuzzy methodology. Mamdani's method was among the first control systems built using fuzzy set theory. It was proposed in 1975 by Ebrahim Mamdani [11] as an attempt to control a steam engine and boiler combination by synthesizing a set of linguistic control rules obtained from experienced human operators. Mamdani's effort was based on Lotfi Zadeh's 1973 paper on fuzzy algorithms for complex systems and decision processes [22]. Although the inference process described in the next few sections differs somewhat from the methods described in the original paper, the basic idea is much the same.

Mamdani-type inference, as defined for Fuzzy Logic Toolbox, expects the output membership functions to be fuzzy sets. After the aggregation process, there is a fuzzy set for each output variable that needs defuzzification. it is possible, and in many cases much more efficient, to use a single spike as the output membership function rather than a distributed fuzzy set. This type of output is sometimes known as a *singleton* output membership function, and it can be thought of as a pre-defuzzified fuzzy set. It enhances the efficiency of the defuzzification process because it greatly simplifies the computation required by the more general Mamdani method, which finds the centroid of a two-dimensional function. Rather than integrating across the two-dimensional function to find the centroid, you use the weighted average of a few data points. Sugeno-type systems support this type of model. In general,

Computer Desktop Encyclopedia

Ninth Edition

Alan Freedman

future proof Not obsolete in the future. As much as the computer field drives the future, there are very few future-proof products within it. One exception might be optical fiber, which seems capable of handling more bandwidth than we can ever imagine. However, we also said 640K would be all the memory we would ever need in a desktop computer.

fuzzy computer A specially-designed computer that employs fuzzy logic. Using such architectural components as analog circuits and parallel processing, fuzzy computers are designed for AI applications.

fuzzy logic A mathematical technique for dealing with imprecise data and problems that have many solutions rather than one. Although it is implemented in digital computers which ultimately make only yes-no decisions, fuzzy logic works with ranges of values, solving problems in a way that more resembles human logic.

Fuzzy logic is used for solving problems with expert systems and realtime systems that must react to an imperfect environment of highly variable, volatile or unpredictable conditions. It "smoothes the edges" so to speak, circumventing abrupt changes in operation that could result from relying on traditional either-or and all-or-nothing logic.

Fuzzy logic was conceived by Lotfi Zadeh, former chairman of the electrical engineering and computer science department at the University of California at Berkeley. In 1964, while contemplating how computers could be programmed for handwriting recognition, Zadeh expanded on traditional set theory by making membership in a set a matter of degree rather than a yes/no situation.

Fuzzy Computer
Since the whole computer industry seems fuzzy much of of the time, how about a really fuzzy computer!

fuzzy logician An individual who is involved in developing fuzzy logic algorithms.

fuzzy search An inexact search for data that finds answers that come close to the desired data. It can get results when the exact spelling is not known or help users obtain information that is loosely related to a topic.

FW See *firewall*.

FWD (Fast Wide Differential) Refers to a Fast Wide SCSI implementation that uses differential signaling. See *SCSI*.
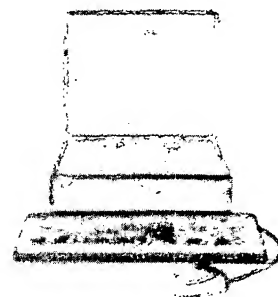
FWIW Digispeak for "for what it's worth."

FWSE (Fast Wide Single Ended) Refers to a Fast Wide SCSI implementation that uses the common single ended signaling. See *SCSI*.

FX See *foreign exchange service*.

FX 32 An emulator from Digital that allows 32-bit Windows programs to run on Alpha machines. It emulates x86 machine language instructions. It also performs a translation of a program the first time it is run so that it will run faster the second and subsequent times.

FYI Digispeak for "for your information."